



2017 Sec 3 Physics End-Of-Year Examination (SA2)

Topics & Guidelines for Revision

Name: () Class: 3/

Date:

Plan for revising all topics

2017 Sec 3		Weeks	Term 3		Break	Term 4			
Topical Notes	Practicals / Textbook	Assignments	9	10		1	2	3	4
1	Physical Quantities & Measurements (including graphical skills)	PR1: Measurement PR2: Simple pendulum	AS 1: Physical quantities & measurements						
2	Kinematics <ul style="list-style-type: none"> Speed, velocity, acceleration Graphical analysis Free-fall Equations of motion 	PR3: Falling ball	AS2.1: Speed, velocity & acceleration						
			AS2.2: s-t & v-t graphs						
			AS2.3: Equations of motion						
3	Dynamics <ul style="list-style-type: none"> Types of forces, free-body diagram, balanced & unbalanced forces Newton's 1st, 2nd & 3rd laws of motion Vector addition Vector resolution 	PR4: Forces in equilibrium	AS3.1: Types of forces & free-body diagrams						
			AS3.2: Newton's 1 st law						
			AS3.3: Newton's 2 nd & 3 rd laws						
			AS3.4: Vector addition of forces						
4	Turning effect of forces <ul style="list-style-type: none"> Moment of a force Principle of moments Centre of gravity & stability 	PR5: Balancing of masses PR6: CG of triangular card	AS 4.1: Moments						
			AS 4.2: CG & Stability						
5	Pressure <ul style="list-style-type: none"> Pressure Pressure differences Pressure measurement 	<i>Read Chapter 6 in textbook</i>	AS 5: Pressure						
6	Work, energy, power <ul style="list-style-type: none"> Energy & energy conversion Principle of conservation of energy Work done Power, Efficiency 	<i>Read Chapter 7 in textbook</i>	AS 6: Work, energy, power & efficiency						
7	Reflection <ul style="list-style-type: none"> Laws of reflection Image in plane mirror Reflection ray diagrams for a light ray, cone of light 	PR7: Reflection	AS 7: Reflection						
8	Refraction <ul style="list-style-type: none"> Laws of refraction Refractive index Refraction ray diagrams Total internal reflection 	PR8: Refraction	AS 8.1: Refraction						
			AS 8.2: Total internal reflection						

Schedule & Format for Physics Papers

Date	Time (duration)	Paper (marks)	Structure & marks	Remarks
Monday 9 Oct	0845 -0930h (45 min)	Paper 1 (30 marks)	<ul style="list-style-type: none"> 30 MCQ Shade all answers on Optical Answer Sheet (OAS) using 2B pencil. 	Shade the answers along the way. Do NOT wait till end of paper to start shading!
	1030 -1215h (1 hour 45 min)	Paper 2 (70 marks)	Section A (40 marks) <ul style="list-style-type: none"> short structured questions 	Answer all questions in the spaces provided. <i>Spend about 1 hour.</i>
			Section B (30 marks) <ul style="list-style-type: none"> 2 long questions 1 Either / Or long question: choose 1 carefully 	Answer all questions in the spaces provided. <i>Spend about 45 min.</i>

Advice for Exam Preparation

- Plan (by date or week) and start your revision from **Term 3 week 9** so that you have sufficient time to
 - cover all topics thoroughly (notes & assignments),
 - have a quick review of past assessments (quizzes, exams, etc.) and
 - do summary notes for key/difficult topics**
 - practise questions from previous years' EOY papers and physics workbook.
- Track your progress using "✓" (planned) and "X" (revised) against each item.**
- Be prepared to handle questions for all **Specific Instructional Objectives** (on first page of topical notes). Also refer to **textbook** "All about Physics" for detailed explanations, worked examples and additional practice **questions** (at the end of each topic).

General Advice for Exam Day

- Get ready your scientific **calculator** (in good working order), a mathematical set (including **protractor, & set square**) and a **30 cm semi-transparent ruler**.
- Have sufficient sleep/rest the day before the paper.
- Ensure you have a spare pen, pencil and eraser.
- You are NOT allowed** to possess any correction fluid/tape in the exam venue.
- Manage your time carefully during the papers!** (Every 1 mark is about 1.5 minutes of work.)

Problem Solving Approach in Physics : I SEE*

*Adapted from *University Physics (with Modern Physics)* by Young and Freedman, 2008 (12th Edn).

IDENTIFY the relevant concepts

Try to **understand** the physics of the problem before choosing the approach or launching into any mathematical analysis

- identify the required variable(s)
- recall related physical laws/principles, formulae and equations
- recall similar systems in related topics

SET UP the problem

- Sketch a **diagram** if it helps (it nearly always does).
- Choose the **equations** or **formulae** you'll use to solve the problem and decide how you'll use them.
- Try to keep expressions algebraic (using **suitable symbols**) rather than numerical.

EXECUTE the solution

- List known and unknown **quantities**.
- Solve the equations for the unknowns.
- Show your **working neatly and clearly** on the page, and explain what you are doing and why you are doing it.

EVALUATE the answer

- Check the **units** of your answer.
- Generally, **use 2 or 3 significant figures** in your **final** numerical answer (keep more s.f.s for intermediate steps).
- Check the **magnitude** of your answer against common sense or other knowledge.

Glossary of Terms used in Questions

Adapted from GCE 'O' Level (2017) syllabus 5059 at

http://www.seab.gov.sg/content/syllabus/olevel/2017Syllabus/5059_2017.pdf

Students should appreciate that

- the meaning of a term must depend in part on its context.
- the **number of marks allocated** for any part of a question is a guide to the depth of treatment required for the answer.

	Terms	Meanings
1	Define (the term(s) ...)	is intended literally. Only a formal statement or equivalent paraphrase, such as the defining equation with symbols identified, being required.
2	Explain/ What is meant by...	normally implies that a definition should be given, together with some relevant comment on the significance or context of the term(s) concerned, especially where two or more terms are included in the question.
3	State	implies a concise answer with little or no supporting argument, e.g. a numerical answer that can be obtained 'by inspection'.
4	List	requires a number of points with no elaboration. Where a given number of points is specified, this should not be exceeded.
5	Describe	requires students to state in words (using diagrams where appropriate) the main points of the topic. It is often used with reference either to particular phenomena or to particular experiments.
6	Predict or deduce	implies that students are not expected to produce the required answer by recall but by making a logical connection between other pieces of information. Such information may be given in the question or may depend on answers in an earlier part of the question.
7	Suggest	is used in two main contexts. <ul style="list-style-type: none"> • It may either imply that there is no unique answer or • that students are expected to apply their general knowledge to a 'novel' situation, one that formally may not be 'in the syllabus'.
8	Calculate	is used when a numerical answer is required. In general, <u>working</u> should be shown.
9	Measure	implies that the quantity concerned can be directly obtained from a suitable measuring instrument, e.g. length, using a rule, or angle, using a protractor.
10	Determine	often implies that the quantity concerned cannot be measured directly but is obtained by calculation, substituting measured or known values of other quantities into a standard formula.
11	Show	is used when an algebraic deduction has to be made to prove a given equation. It is important that the terms being used by students are stated explicitly.
12	Estimate	implies a reasoned order of magnitude statement or calculation of the quantity concerned. Candidates should make such simplifying assumptions as may be necessary about points of principle and about the values of quantities not otherwise included in the question.
13 a	Sketch	when applied to <u>graph work</u> , implies that the shape and/or position of the curve need only be qualitatively correct. However, depending on the context, some quantitative aspects may be looked for, e.g. passing through the origin, having an intercept, asymptote or discontinuity at a particular value. Students must clearly indicate what is being plotted on each axis.
13 b	Sketch	when applied to <u>diagrams</u> , implies that a simple, freehand drawing is acceptable: nevertheless, care should be taken over proportions and the clear exposition of important details.

- *Please clarify any term you're unsure of with your physics teacher!*

Mathematical Skills Expected

Adapted from GCE 'O' Level (2017) syllabus 5059 at

http://www.seab.gov.sg/content/syllabus/olevel/2017Syllabus/5059_2017.pdf

Arithmetic

Students should be able to:

- recognise and use expressions in decimal and standard form (scientific) notation
- use appropriate calculating aids (electronic calculator or tables) for addition, subtraction, multiplication and division. Find arithmetic means, powers (including reciprocals and square roots), sines, cosines and tangents (and the inverse functions)
- take account of accuracy in numerical work and handle calculations so that **significant figures** are neither lost unnecessarily nor carried beyond what is justified, rounding answers correctly when necessary
- make approximations and estimates to obtain reasonable answers

Algebra

Students should be able to:

- change the subject of an equation
- solve simple algebraic equations, including linear simultaneous equations
- use direct and inverse proportion
- substitute physical quantities into physical equations using consistent units
- formulate simple algebraic equations as mathematical models of physical situations and to represent information given in words

Geometry and trigonometry

Students should be able to:

- understand the meaning of angle, curve, circle, radius, diameter, square, parallelogram, rectangle and diagonal
- calculate areas of right-angled triangles and circles, areas and volumes of rectangular blocks, volumes of cylinders
- use the angle sum of a right angle and adjacent angles on a straight line
- use sines, cosines and tangents
- use usual mathematical instruments (rules, compasses, protractor, set square)
- recognise and use points of the compass (N, S, E, W)

Graphs

Students should be able to:

- translate information between graphical, numerical, algebraic and verbal forms**
- select appropriate variables and scales for graph plotting
- for linear graphs, determine the slope and state the intercept and intersection
- choose, by inspection, a straight line which will serve as the best straight line through a set of data points presented graphically
- recall standard linear form $y = mx + c$ and rearrange relationships into linear form where appropriate
- understand, draw and use the slope of a tangent to a curve as a means to obtain the gradient

- *Please clarify any mathematical skill you're unsure of with your physics teacher!*